

## mmWave Inter-Satellite Transceiver, Phase I

Completed Technology Project (2014 - 2014)



## Project Introduction

Future spacecraft will require services offering higher data rates than those supported today and with improved SWAP and performance. Complicating the environment in which these technologies operate is the shortage of available and interference free radio spectrum. While the incremental advances in equipment design and performance in X, Ka bands requested in this topic may meet some of these future needs, MaXentric believes that developing equipment to provide high bandwidth communication services in as yet underutilized spectrum, namely the Inter-Satellite band 59-71 GHz, offers a higher return on investment and a more significant capability enhancement. The recent rapid commercialization of the E and V Bands (71-76, 81-86 and 60GHz) for terrestrial use has driven the development of a large, cost sensitive market place for RF components that didn't exist even a few years ago. In this proposal MaXentric suggests revisiting the utility of these frequencies for space based high data rate communications by developing and demonstrating a high data rate transceiver for the range 59-71 GHz. As a Phase 1 and 2 participant in Darpa's Fractionated Satellite ("F6", 60GHz, 1Gbps) , Mobile Hotspot UAV ("MHS", E Band, 1Gbps) and Microscale Power Conversion ("MPC") programs, MaXentric is in a unique position to design, develop and demonstrate a small, low SWAP, high data rate, power efficient, 59-71 GHz transceiver that could be incorporated into NASA's SCan Integrated Network Architecture in the future. This capability would not be restricted by availability of spectrum and has other inherent advantages because the attenuation of Earth's atmosphere reduces interference and associated coordination requirements. MaXentric believes the availability of almost 12 GHz of unrestricted communications bandwidth provides a very significant opportunity for the provision of high data rate services.



mmWave Inter-Satellite  
Transceiver, Phase I

## Table of Contents

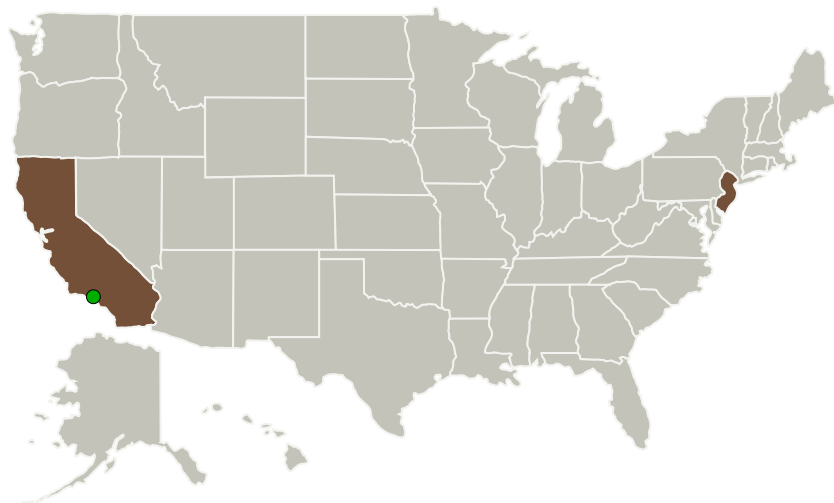
Project Introduction	1
Primary U.S. Work Locations and Key Partners	2
Project Transitions	2
Organizational Responsibility	2
Project Management	2
Technology Maturity (TRL)	2
Images	3
Technology Areas	3
Target Destinations	3

## mmWave Inter-Satellite Transceiver, Phase I

Completed Technology Project (2014 - 2014)



## Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
MaXentric Technologies, LLC	Lead Organization	Industry	Fort Lee, New Jersey
● Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California

## Primary U.S. Work Locations

California	New Jersey
------------	------------

## Project Transitions

▶ **June 2014:** Project Start

✓ **December 2014:** Closed out

## Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/137475>)

## Organizational Responsibility

## Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

## Lead Organization:

MaXentric Technologies, LLC

## Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

## Project Management

## Program Director:

Jason L Kessler

## Program Manager:

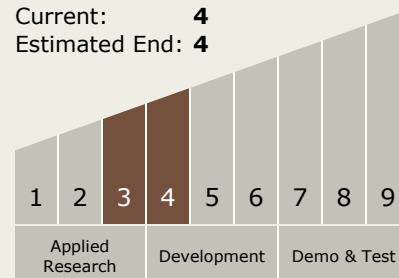
Carlos Torrez

## Principal Investigator:

Kamran Mahbobi

## Technology Maturity (TRL)

Start: **3**  
Current: **4**  
Estimated End: **4**



# mmWave Inter-Satellite Transceiver, Phase I

Completed Technology Project (2014 - 2014)



## Images



### Briefing Chart

mmWave Inter-Satellite  
Transceiver, Phase I

(<https://techport.nasa.gov/image/133144>)

## Technology Areas

### Primary:

- TX05 Communications, Navigation, and Orbital Debris Tracking and Characterization Systems
  - └ TX05.2 Radio Frequency
    - └ TX05.2.2 Power-Efficiency

## Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System